PB-246 635

IMPLEMENTATION PLAN REVIEW FOR NEVADA REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

TRW/Environmental Services

Prepared for:

Environmental Protection Agency

February 1975

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

325051

PB 246 635

EPA-450/3-75-007

FEBRUARY 1975

IMPLEMENTATION PLAN REVIEW FOR NEVADA AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

U. S. ENVIRONMENTAL PROTECTION AGENCY

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
US Department of Commerce
Springfield, VA 22151

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-450/3-75-007	2.
3. RECIPIENT'S ACCESSION NO. PB 246 635	
4. TITLE AND SUBTITLE IMPLEMENTATION PLAN REVIEW FOR NEVADA AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT	5. REPORT DATE February 1975
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C., Regional Office IX, San Francisco, California; and TRW, Inc. Redondo Beach, California	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO. 68-02-1385
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air and Waste Management Office of Air Quality Planning and Standards Research Triangle Park, North Carolina 27711	13. TYPE OF REPORT AND PERIOD COVERED Final
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution State implementation plans		

PRICES SUBJECT TO CHANGE

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release unlimited	Unclassified	49
	20. SECURITY CLASS (This page)	22. PRICE
	Unclassified	$4.00

EPA Form 2220-1 (9-73)

EPA-450/3-75-007

IMPLEMENTATION PLAN REVIEW

FOR

NEVADA

REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

PREPARED BY THE FOLLOWING TASK FORCE:

U.S. Environmental Protection Agency, Region IX
100 California Street
San Francisco, California 94111

Environmental Services of TRW, Inc.
(Contract 68-02-1385)

U.S. Environmental Protection Agency
Office of Air and Waste Management
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

February 1975

NEVADA

ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

(SECTION IV - STATE IMPLEMENTATION PLAN REVIEW)

		Page
1.0	EXECUTIVE SUMMARY	1
2.0	REVIEW OF THE STATE IMPLEMENTATION PLAN AND CURRENT AIR QUALITY	6
	2.1 Summary	6
	2.2 Air Quality Setting for the State of Nevada	9
	2.3 Background on the Development of the Current State Implementation Plan	9
	2.4 Special Considerations for the State of Nevada	10
3.0	AQCR ASSESSMENTS	11
	3.1 Clark-Mohave-Yuma AQCR (#013)	11
	3.2 Nevada Intrastate AQCR (#147)	12
	3.3 Northwest Nevada Intrastate AQCR (#148)	12
4.0	TECHNICAL APPENDICES	
	APPENDIX A - State Implementation Plan Background	14
	APPENDIX B - Regional Air Quality Analysis	33
	APPENDIX C - Power Plant Assessment	36
	APPENDIX D - Industrial, Commercial, Institutional Source Assessment	40
	APPENDIX E - Area Source Assessment	43
	BIBLIOGRAPHY	44

1.0 EXECUTIVE SUMMARY

The enclosed report is the U.S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the State on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel combustion stationary sources within three months after they are submitted to EPA by the States. The States may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require States to change any existing plan.

Congress has intended that this report provide the State with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage States to either defer compliance regulations or to revise the SO_2 emission regulations. The States have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuel policy has addressed only those States with the largest clean fuels saving potential. Several of these States have or are currently in the process of revising SO_2 regulations. These States are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 States and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are 1) The use of the example region approach in developing State-wide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many State plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a State to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in the region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the State if the control regulations were applied to similiar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the State where sources would not otherwise contribute to NAAQS violations. For instance, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned state-wide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of States will use the review findings to assist them in making the decision whether or not to revise portions of their State Implementation Plans. However, it is most important for those States which desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended or adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based is the most currently available to the Federal Government. However, EPA believes that the States possess the best information for developing revised plans. The States have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of air quality standards. Therefore, those States desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that States select control strategies which place emissions from fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emission regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution problems such as sulfates.

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is

because stationary fuel combustion sources constitute a major source of SO_2 and TSP emissions.

Part of each State's review was organized to provide an analysis of the SO_2 and TPS emission tolerances within each of the various AQCR's. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-cleaning" accomplished by a SIP. The tolerance assessments have been combined in Appendix B with other regional air quality indicators in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the State's fuel combustion sources (power plants, industrial sources and area sources) has been carried out in Appendices C, D and E.

The Nevada State Implementation Plan has been reviewed for the most frequent causes of over-restrictive emission limiting regulations. The major findings are as follows:

Although Nevada used the Example Region Approach in developing control strategies for both TSP and SO_2 and has a 24-hour SO_2 air quality standard more restrictive than NAAQS, there are no clear indications that current regulations for either SO_2 or TSP are overly-restrictive.

These findings are supported as follows:

- As in the situation in many western states, high particulate concentrations are found in all of Nevada's Air Quality Control Regions. In the arid environment natural background levels combined with activities such as agriculture, unpaved roads and construction is suspected as being the primary cause of ambient measurements which exceed the national standards. Any increase in man-made emissions caused by revising the existing regulations for controlling particulates from stationary fuel combustion sources would only aggravate the existing situation. There is currently little possibility, therefore, of revising particulate regulations.

- The majority of SO_2 emissions in the State emanate from large point sources such as the copper smelter (mainly process losses) and power plants. With regard to SO_2 emissions from power plants, the review fails to find an abundance of available modeling or air quality data by which to judge the restrictiveness of the regulations which apply within any of Nevada's three AQCR's. Although this review can not suggest that fuel combustion regulations are overly-restrictive, additional monitoring and modeling in the vicinity of major sources such as the Mohave Power Plant are necessary before a final determination is made concerning the stringency of regulations.

2.0 NEVADA STATE IMPLEMENTATION PLAN REVIEW

2.1 SUMMARY

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the State have air quality standards which are more stringent than NAAQS?
- Does the State have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?
- Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on reported (1973) air quality data, are there indications of a tolerance for increased emissions?
- Are the total emissions from stationary fuel combustion sources proportionally lower than those of all other sources?
- Is there a significant clean fuels savings potential in the region?
- Must emission regulations be revised to accomplish significant switching?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?

The following portion of this report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP review report, Section 2 and Appendix A, was orgarized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for

revising regulations. Emission tolerance estimates have been combined in Appendix B with other regional air quality indicators in an attempt to provide an evaluation of a region's candidacy for revising emission limiting regulations. In conjunction with the regional analysis, a characterization of the State's fuel combustion sources (power plants, industrial sources and area sources) has been carried out in Appendices C, D and E.

Based on an overall evaluation of EPA's current information, AQCR's have been classified as good, marginal or poor candidates for regulation revisions. The following table summarizes the State Implementation Plan Review. The remaining portion of the report supports this summary with explanations.

STATE IMPLEMENTATION PLAN REVIEW
(SUMMARY)

"INDICATORS"	STATE		Clark-Mohave-Yuma AQCR		Nevada Intra-state AQCR		Northwest Nevada Intrastate AQCR	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?	Yes	Yes [1]						
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources	Yes Yes Yes	Yes Yes Yes						
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	Yes	Yes						
• Has the State not initiated action to modify combustion source emission regulations for fuel savings, i.e., under the Clean Fuels Policy?	Yes	Yes [5]						
• Are there no proposed Air Quality Maintenance Areas?			No	Yes	Yes	Yes	No	Yes
• Are there indications of a sufficient number of monitoring sites within a region?			Yes	No	Yes	No	Yes	No
• Is there an expected 1975 attainment date for NAAQS?			Yes	Yes	No	2	No	3
• Based on reported (1973) Air Quality Data, does air quality meet NAAQS?			No	N/A	No	No	No	N/A
• Based on reported (1973) Air Quality Data, are there indications of a tolerance for increasing emissions?			No	N/A	No	No [6]	No	N/A
• Are the total emissions from stationary fuel combustion sources lower than those of other sources?			Yes	No	Yes	Yes	Yes	Yes
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			N/A	N/A	N/A	N/A	N/A	N/A
• Must emission regulations be revised to accomplish significant fuel switching?			No	Yes	No	Yes	No	Yes
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			Poor	Marginal	Poor	Poor	Poor	Marginal
• Is there a significant Clean Fuels Saving potential in the region?			N/A	N/A	N/A	N/A	N/A	N/A

1 Only for the annual and 24-hour standard

2 7/75 for primary, 18 month extension granted for the secondary

3 Ambient air quality was below the NAAQS when the SIP was written

4 Only for the annual standard.

5 The State has relaxed regulations as to power plants and other fuel combustion sources for the control of sulfur emissions, thus allowing a greater range of fuel to be used.

6 Not available for the portion of the AQCR not affected by the Kennecott Copper Corporation Smelter.

2.2 AIR QUALITY SETTING - STATE OF NEVADA

The State of Nevada is divided into three Air Quality Control Regions (see Figure A-1): Clark-Mohave-Yuma Interstate (#013), Nevada Intrastate (#147) and the Northwest Nevada Intrastate (#148). Priority classifications for TSP, SO_2 and NO_x in these AQCR's are given in Table A-1. Only two counties, Clark County in the Clark-Mohave-Yuma AQCR and Washoe County in the Northwest Nevada AQCR, have been designated as proposed Air Quality Maintenance Areas. Clark County is proposed for TSP and oxidant, while Washoe County is proposed only for TSP.

Table A-4 illustrates both federal and state standards for the pollutants under consideration in this report. Both sets of standards are identical, except Nevada has more stringent annual and 24 hour SO_2 standard.[1] A summary of the most currently available air quality data is shown in Tables A-5 and A-6. Nine stations in the Nevada portion of the Clark-Mohave-Yuma AQCR, three stations in the Nevada Intrastate AQCR and six stations in the Northwest Nevada AQCR report violations of the national secondary 24 hour particulate standard. As for SO_2, the only stations reporting data are located in the Nevada Intrastate AQCR, where five out of nine monitors recorded violations of the national 24 hour standard.

Emissions of SO_2 and particulate matter are summarized in Tables A-8 and A-9. A large proportion of particulate emissions is fugitive dust, while SO_2 emissions can be attributed mainly to either copper smelter process losses or to power plants.

2.3 BACKGROUND ON THE DEVELOPMENT OF THE CURRENT STATE IMPLEMENTATION PLAN

The State of Nevada adopted an example region approach in writing its implementation plan. The Clark-Mohave-Yuma AQCR was selected as the example region for all pollutants except for SO_2, for which the Nevada Intrastate AQCR was chosen as the example region. Nevada standards were used in developing control strategies and a proportional rollback model was applied to calculate the emission reductions required.

---

[1] The federal secondary TSP standard of 60 $\mu g/m^3$ is only a guideline.

The Nevada SIP did not provide a particulate control strategy adequate to attain national standards in the Northwest Nevada and Nevada Intrastate AQCR's. The plan did not include natural windblown dust and fugitive dust from various human activities in the emissions inventory, nor did the State commit itself to the development of land use and/or transportation controls on a local basis necessary to solve the problem. EPA is in the process of deciding what measures are acceptable for the control of man-induced fugitive dust.

Regarding SO_2, the control strategy was disapproved for the Nevada Intrastate AQCR because it did not provide adequate control for the Kennecott copper smelter at McGill. The Kennecott Copper Corporation will implement controls with the assistance of recently proposed EPA regulations. Such controls will be sufficient to cause the national standards to be attained and maintained starting in 1977.

2.3.1 Particulate Control Strategy

Regulations directed towards the control of particulate emissions include: process weight table rate schedule, control of open burning and fuel combustion particulate emissions.

2.3.2 SO_2 Control Strategy

The limitation of SO_2 emissions is aimed primarily at discharges from copper smelting process operations and power plants.

2.4 SPECIAL CONSIDERATIONS - STATE OF NEVADA

The Clark-Mohave-Yuma AQCR is classified Priority I for oxidants. The impact of fuel switching (i.e. natural gas to oil) can only aggravate the oxidant problem, because hydrocarbon emissions from oil combustion are an order of magnitude greater than natural gas combustion (see Table C-2). A similar situation exists for coal combustion hydrocarbon emissions as opposed to oil or natural gas.

As is the situation in many western states, fugitive dust is a problem in all Nevada AQCR's and is a primary cause of ambient measurements which exceed the national standards. In the arid environment, natural background levels are significant and are aggravated by human activities. Particulate standards are not likely to be attained and maintained in any Nevada AQCR.

3.0 AQCR ASSESSMENTS

3.1 CLARK-MOHAVE-YUMA AQCR (#013)

3.1.1 Regional Air Quality Assessment

Particulate matter has remained a major problem in this AQCR since the time the original implementation plan was submitted. A major source of particulate emissions is wind-blown fugitive dust, whereas man-made sources include mineral industry operations. There is limited SO_2 monitoring data available in the vicinity of the Mohave Power Plant (the major source of SO_2 for the region) and in the area of the AQCR impacted by the three other power plants. Although Clark County's SO_2 fuel combustion regulations are especially stringent, this review cannot conclude from available evidence that these regulations are unduly stringent. Any revision of current regulations would require new evidence gathered from additional continuous monitoring stations at locations based on new modeling results.

3.1.2 Power Plant Assessment

There are four power plants in the Nevada portion of the Clark-Mohave-Yuma AQCR. Two of these facilities, Mohave and Reid-Gardner, have the capability of burning coal. Mohave is currently on a compliance schedule and Reid-Gardner is on a variance. The other two plants, Clark and Sunrise, are dual oil-natural gas fired units and are in compliance with Clark County regulations. Table C-1 illustrates the probable impact of fuel switching on SO_2 and particulate emissions at these plants. The term fuel switching means that Mohave would burn only coal (instead of coal and natural gas or fuel oil) and Sunrise and Clark would use only oil (instead of oil and natural gas).

3.1.3 Industrial/Commercial/Institutional Source Assessment

There are no sources in this category that are currently burning coal or have the capability of using coal without extensive modification. An analysis is performed in Table D-1 as to the resulting change in emissions if a fuel switch from natural gas to oil is made.

3.1.4 Area Source Assessment

The Clark-Mohave-Yuma AQCR was found to have no area sources which could be analyzed within the context of Section 4 of ESECA.

3.2 NEVADA INTRASTATE AQCR (#147)

3.2.1 Regional Air Quality Assessment

The most currently available air quality data indicates frequent violations of both the SO_2 and particulate standards (Tables A-5 and A-6). SO_2 emissions can be attributed mainly to process losses from the one copper smelter, while fugitive dust is a major source of particulate matter. EPA estimates that controls on the smelter will be sufficient to allow the national standards to be attained and maintained starting in 1977. Particulate matter, however, will remain a major problem.

There are no indications that the regulations are overly restrictive.

3.2.2 Power Plant Assessments

There are no external combustion power plants in the Nevada Intrastate AQCR which can be analyzed within the context of Section 4 of ESECA. A 45 MW steam electric plant at McGill is kept idling at present but may return to service if out-of-state electricity supplies prove unreliable.

3.2.3 Industrial/Commercial/Institutional Source Assessment

In this category, all sources under consideration within the scope of this project use either oil or coal as a fuel (Table D-1). The analysis presented in Appendix D shows the resulting emissions if all the sources were to emit SO_2 and particulates at the emission limit.

3.2.4 Area Source Assessment

The Nevada Intrastate AQCR was found to have no area sources which could be analyzed within the context of Section 4 of ESECA.

3.3 NORTHWEST NEVADA INTRASTATE AQCR (#148)

3.3.1 Regional Air Quality Assessment

As is the situation in the other two Nevada AQCR's, particulate matter is a major problem. 1973 air quality data indicates that there are frequent violations of the national secondary standards. Again, fugitive dust emissions

are a major source of particulate matter. There is, unfortunately, no SO_2 air quality data available. However, the only major sources of SO_2 in the AQCR are two power plants, one in Lyon County (Tracy plant) and one in Storey County (Ft. Churchill plant).

There are no indications that fuel combustion regulations are overly restrictive.

3.3.2 Power Plant Assessment

The two external combustion steam electric power plants in this AQCR are dual oil-natural gas fired and are unable to use coal without extensive modification. Table C-1 illustrates the resulting emissions if these plants were to burn only oil.

3.3.3 Industrial/Commercial/Institutional Source Assessment

Table D-1 illustrates the resulting emissions if this class of sources were to emit SO_2 and particulate matter up to the limit allowed by regulations.

3.3.4 Area Source Assessment

The Northwest Nevada Intrastate AQCR was found to have no area sources which could be analyzed within the context of Section 4 of ESECA.

APPENDIX A. STATE IMPLEMENTATION PLAN BACKGROUND

- State implementation plan information
- Current air quality information
- Current emission information

Tables in this appendix summarize original and modified state implementation plan information, including original priority classifications, attainment dates, ambient air quality standards and fuel combustion emission regulations. SAROAD data for SO_2 and TSP monitoring stations are shown for AQCR's in the state. NEDS emission data by AQCR[1] are tabulated and are broken down into fuel burning categories.

Tables A-10 and A-11 show a comparison of emission inventories in the original SIP and those from NEDS. An emission tolerance, or emission tonnage which might be allowed in the AQCR and still not violate national secondary ambient air quality standards, is shown for SO_2 and particulates. Tolerance was based on either the degree of control expected by the SIP or upon air quality/emission relationships which are calculated from more recent data. The value of the emission tolerance provides an indication of the degree of potential an AQCR possesses for fuel revisions and regulation relaxation.

Methodology for Increased Emissions Tolerance

A tolerance for increased emissions was determined as follows. First, an "allowable emissions" was calculated for each AQCR based on the current NEDS data and the percent reduction (or increase) required to meet the national secondary ambient air quality standards in that AQCR (worst case from Tables A-5 and A-6). This "allowable" was then compared to that from the SIP. If reasonable agreement occurred, then the "estimated emissions" which would result after implementation of the SIP in that AQCR was used to calculate an emissions tolerance. Thus, some credit could be given to an AQCR which might be restricting emissions more than required by ambient air quality standards. For instance, emission controls applied to AQCR's

[1] "1975 National Emissions Report", EPA - 450/2-74-012, June 1974

for the state may reduce emissions well below the allowables. In the event that no data existed or was available from the SIP for an AQCR, the current air quality was used to assign emission tolerances based on proportional rollback or rollup. Current air quality was also the criteria, if emissions data from SIP and NEDS did not appear to be comparable (this was often the case).

When no SIP emissions data was available and current air quality levels were less than one half of the level represented by an ambient air quality standard, no "rollup" emission tolerance was calculated in Tables A-10 and A-11. This arbitrary cutoff point was chosen so as not to distort the emission tolerance for an area. At low levels of a pollutant, the relationship between emissions and air quality is probably not linear [1]. Although this cutoff may leave some AQCR's with no quantifiable emissions tolerance, it was felt that no number at all would be preferable to a bad or misleading number.

It is emphasized that emission tolerance is a region-wide calculation. This tolerance obviously makes more sense in, say, an urban AQCR with many closely spaced emission sources than in a largely rural AQCR with geographically dispersed emissions.

---

[1] Low concentrations of pollutants probably indicate a low density of sources and that the air quality monitors are not located near the sources. Thus changes in emissions from the sources will not result in a linear change in air quality readings.

Table A-1 Nevada Air Pollution Control Areas

Air Quality Control Region	Federal Number	Priority Classification[a]			Proposed AQMA Designations[b]	
		Particulate	SO_x	NO_x	TSP Counties	SO_x Counties
Clark-Mohave-Yuma[c]	013	I	IA	III	(1) Clark	(0)
Nevada Intrastate	147	IA	IA	III	(0)	(0)
Northwest Nevada Intrastate	148	I	III	III	(1) Washoe	(0)

[a] Criteria based on maximum measured (or estimated) pollution concentration ($\mu g/m^3$) in area

Priority	I	II	III
	Greater than	From-to	Less than
Sulfur oxide			
Annual arithmetic mean	100	60-100	60
24-hour maximum	455	260-455	260
Particulate matter			
Annual geometric mean	95	60-95	60
24-hour maximum	325	150-325	150
Nitrogen dioxide	110		110

[b] Federal Register, August 1974, SMSA's showing potential for NAAQS violations due to growth

[c] Interstate AQCR

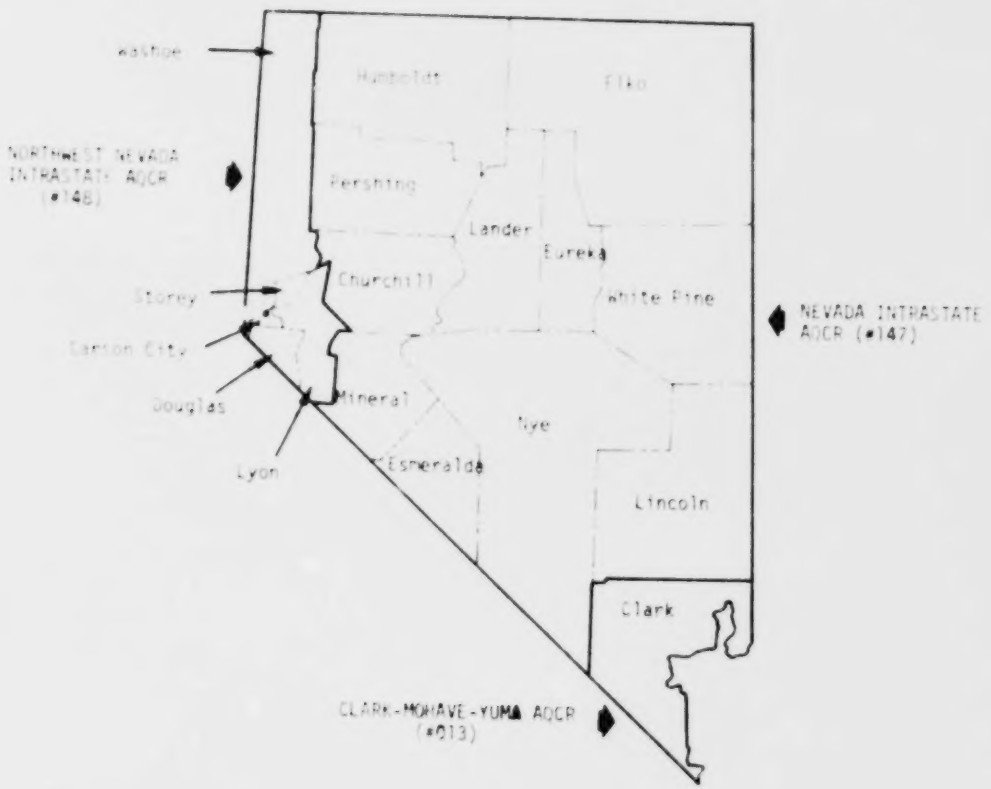

Figure A-1 State of Nevada

Table A-2. Nevada Population and Area

Air Quality Control Region	County	Area (Square Miles)	1970 Population	Population Density (Per square mile)
Clark - Mohave - Yuma[a]	Clark	7874	273,288	34.7
Nevada Intrastate	Churchill	4883	10,513	2.2
	Elko	17162	13,958	0.8
	Esmeradla	3570	629	0.18
	Eureka	4182	948	0.23
	Humboldt	9702	6,375	0.65
	Lander	5621	2,666	0.48
	Lincoln	10649	2,557	0.24
	Mineral	3765	7,051	1.9
	Nye	18064	5,599	0.31
	Pershing	6001	2,670	0.44
	White Pine	8904	10,150	1.1
Northwest Nevada Interstate	Carson	141	15,468	109.7
	Douglas	723	6,882	9.5
	Lyon	2010	8,221	4.1
	Storey	262	695	2.7
	Washoe	6375	121,068	19.0

[a] Interstate; only counties in the Nevada portion are included

Table A-3 Attainment Dates

AQCR #	AQCR Name	Particulates Attainment Dates		Sulfur Dioxide Attainment Dates		Nitrogen Oxides Attainment Dates
		Primary	Secondary	Primary	Secondary	
013	Clark-Mohave-Yuma [a]	7/75	7/75	7/75	7/75	c
147	Nevada Intrastate	7/75	7/77	7/75	b	c
148	Northwest Nevada Intrastate	7/75	7/77	c	c	c

[a] Interstate with Arizona

[b] 18 month extension granted

[c] Ambient air quality below standards when the SIP was written

Table A-4 Nevada Ambient Air Quality Standards

All Concentrations in $\mu g/m^3$

		Total Suspended Particulates		Sulfur Oxides			Nitrogen Dioxide
		Annual	24-Hr.	Annual	24-Hr.	3-Hr.	
Federal	Primary	75 (G)	260[a]	80 (A)	365[a]	----	100 (A)
	Secondary	60 (G)[b]	150[a]	-----	-----	1300[a]	100 (A)
Nevada		60 (G)	150[c]	60 (A)	260[c]	1300[c]	100 (A)

(A) Arithmetic mean
(B) Geometric mean

[a] Not to be exceeded more than one time a year

[b] This is only a guideline standard (as of September 14, 1973)

[c] The State has made no specification as to the number of violations of the 24 hour and 3 hour standards which are permissible

Table A-5 Nevada AQCR Air Quality Status, TSP [a]

AQCR Name	State	# Of Stations Reporting	TSP Concentration ($\mu g/m^3$)			# of Stations Exceeding Ambient Air Quality Standards						% Reduction Required to Meet Standards [d]
			Highest Reading		2nd Highest Reading 24 Hr.	Primary		Secondary				
			Annual	24 Hr.		Annual	24 Hr.[c]	Annual	%	24 Hr[c]	%	
Clark-Mohave-Yuma [b]	Nevada	16	177	850	792	6	3	8	47	9	53	81 [e]
	Arizona	5	109	1101	287	1	1	1	20	1	20	59 [f]
Nevada Intrastate	Nevada	9	87	365	327	1	2	2	22	3	33	54 [e]
Northwest Nevada Intrastate	Nevada	15	98	563	305	6	2	8	53	6	40	52 [f]

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974

[b] Interstate

[c] Violations based on more than one excess of the standard

[d] Calculated from: $\frac{\text{2nd Highest 24hr. Reading - 24hr. Secondary Standard}}{\text{2nd Highest 24 hr. Reading}}$ or $\frac{\text{Highest Annual Reading-Annual Secondary Std}}{\text{Highest Annual Reading - Background}}$

[e] Based on 24 Hr. standard

[f] Based on annual standard

NOTE : 24 hour background assumed to be zero. Annual background for all AQCR's = 25 $\mu g/m^3$

Table A-6 Nevada AQCR Air Quality Status, SO_2 [a]

AQCR Name	State	# of Stations Reporting 24-hr. (Bubbler)	# of Stations Reporting (Contin.)	SO_2 Concen. ($\mu g/m^3$)			# Stations Exceeding Ambient Air Quality Stds.			% Reduction Required To Meet Standards [e]
				Highest Reading		2nd Highest Reading [c]	Primary [d]		Secondary [d]	
				Annual	24-Hr.	24-Hr.	Annual	24-Hr.	3-Hr.	
Clark-Mohave-Yuma [b]	Nevada	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Arizona	1	0	3	10	2	0	0	N/A	f
Nevada Intrastate	Nevada	6	3	257	2758	2515	2	5	3	86 [g]
Northwest Nevada Intrastate	Nevada	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974.

[b] Interstate

[c] The 2nd highest readings were given only at 24-hr. stations and not at continuous stations. The values in this column are from 24. hr. stations and may not be the true 2nd highest reading (since the 2nd highest reading from continuous stations may be larger in value).

[d] Violations based on more than one excess of the standard

[e] Calculated from : $\frac{\text{2nd Highest 24-hr. Reading - National 24-hr. Std.}}{\text{2nd Highest 24-hr. Reading}}$ or $\frac{\text{Highest Annual Reading-Annual Secondary Std.}}{\text{Highest Annual Reading-Background}}$

[f] Reductions were not calculated because the annual and 24-hr. readings are less than ½ of the corresponding standard. It was decided in this case that calculating reductions would yield misleading results.

[g] Based on 24-hr. reading

NOTE : Background assumed to equal zero for both annual and 24-hr. concentrations

N/A = Not Available

Table A-7 Nevada Fuel Combustion Source Summary

AQCR	Nevada Power Plants [a]	Other Nevada Fuel Combustion Point Sources [b]	Total Nevada Fuel Combustion Emissions (10^3 tons/year)	
			Particulates	SO_2
Clark-Mohave-Yuma [c]	4	1	8.856	55.603
Nevada Intrastate	1	5	0.314	1.758
Northwest Nevada Intrastate	2	1	0.498	1.164

[a] Does not include plants which are only gas turbine or diesel units

[b] Includes all sources in NEDS with SCC codes starting with 101 and 102.

[c] Interstate

Note: A point source is defined as (a) any stationary source causing emissions in excess of 100 tons/year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U.S. Bureau of the Census, was equal to or greater than 1 million or (b) any stationary source causing emissions in excess of 25 tons per year of any pollutant for which there is a national standard in a region containing an area whose 1970 "urban place" population, as defined by the U.S. Bureau of Census, was less than 1 million, or (c) without regard to the amount of emissions, stationary sources as those listed in Appendix C of EPA Publication No. APTD-1135 (March, 1973).

Table A-8 Nevada Emissions Summary, Particulates[a]

AQCR	State	Total Particulates (tons/yr.)	Electrical Generation		Industrial, Institutional, Commercial Point Source Fuel Combustion		Area Source Fuel Combustion		Other Sources of Particulate Emissions	
			tons/yr	% of total	tons/yr	% of total	tons/yr	% of total	tons/yr	% of total
Clark-Mohave-Yuma[b]	Nevada	63,128	8486	13.4	28	0.04	342	0.5	54,272	86
	Arizona	1,300	15	1.2	0	0	49	3.8	1,235	95
Nevada Intrastate	Nevada	37,189	0	0	144	0.38	170	0.46	36,875	99.2
Northwest Nevada Intrastate	Nevada	3,344	119	3.6	1	0	378	11.5	2,846	85.1

[a] 1972 emissions in data bank as of June 27, 1974

[b] Interstate

Table A-9 Nevada Emission Summary, SO_2 [a]

AQCR	State	Total SO_2 (tons/yr)	Electrical Generation		Industrial, Institutional, Commercial Point Source Fuel Combustion		Area Source Fuel Combustion		Other Sources of SO_2 Emissions	
			tons/yr	% of total	tons/yr	% of total	tons/yr	% of total	tons/yr	% of total
Clark-Mohave-Yuma [b]	Nevada	57,024	54,876	96.2	1	0	726	1.3	1,421	2.5
	Arizona	594	1	0.2	0	0	50	8.4	543	91.4
Nevada Intrastate	Nevada	275,264	0	0	1435	0.51	323	0.12	273,506	99.4
Northwest Nevada Intrastate	Nevada	3,753	282	7.5	9	0.26	873	23.3	2,589	68.9

[a] 1972 emissions in data bank as of June 7, 1974

[b] Interstate

Table A-10 Nevada Required Emission Reductions, Particulates

From SIP | From 1972 and 1973 Data

AQCR	County	AQ Measurement Control Value ($\mu g/m^3$)	Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	1975 Estimated Emissions After Controls (10^3 tons)	% Reduction Required Based on 1973 AQ Data	1972 NEDS Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	Emissions Tolerance (10^3 tons)	Comments
Clark-Mohave-Yuma[a]	Clark	137[b]	88.99	27.56	13.114	81	63.1	11.9	-51.2	
Nevada Intra-state	Chur-chill	442[c]	0.493	0.148	0.554	54	37.18	17.1	-20.08	The SIP contained detailed information for only the counties listed. Although Mineral and Churchill Counties were not projected by the SIP to meet the standards, EPA has yet to determine what controls will allow the NAAQS to be attained 1972 and 1973 AQ and emissions data are for the entire AQCR.
	White Pine	100[c]	8.54	1.386	1.136					
	Miner-al	336[b]	0.472	0.189	0.514					
	Elko	67[c]	1.84	1.55	1.33					
	Nye	93[b]	1.506	0.768	0.715					
Nevada Intra-state	Carson City	234[b]	2.041	1.25	0.458	52	3.34	1.6	-1.73	Although Lyon and Washoe Counties were not projected to meet the standards, EPA has yet to determine what additional controls are required such that NAAQS can be attained. 1972 and 1973 AQ and emissions data are for the entire AQCR.
	Douglas	266[b]	2.627	1.37	0.680					
	Lyon	346[b]	0.741	0.29	0.743					
	Storey	93[b]	0.283	0.710	0.219					
	Washoe	169[b]	4.414	1.73	2.006					

a. Interstate counties included are only those in the Nevada portion of the AQCR

b. Annual geometric mean

c. 24 hour maximum

Table A-11 Nevada Required Emission Reduction, SO_2

		From SIP				From 1972 and 1973 Data				
AQCR	County	AQ Measurement Control value ($\mu g/m^3$)	Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	1975 Estimated Emissions After Controls (10^3 tons)	% Reduction Required Based on 1973 AQ Data	1972 NEDS Emissions (10^3 tons)	Allowable Emissions (10^3 tons)	Emission Tolerance (10^3 tons)	Comments
Clark-Mohave-Yuma [3]	Clark	N/A	45.6	N/A	N/A	N/A	57.024	N/A	N/A	At the time the SIP was written, there were no reported violations of the standards. Thus no control strategy was required. However, this AQCR is classified Priority IA due to planned additional sources
Nevada Intrastate	White Pine	455 [b]	252.75	133.95	100.48	66	275.264	38.5	-236.727	The SIP contained detailed information only for White Pine County. 1972 and 1973 AQ and emissions data are for the entire AQCR
Northwest Nevada Intrastate	Carson City	N/A	0.207	N/A	N/A	N/A	3.753	N/A	N/A	Because this AQCR is classified Priority III for SO_2, no control strategy was required in the SIP. 1972 and 1973 AQ and emissions data are for the entire AQCR
	Douglas	N/A	0.169	N/A	N/A					
	Lyon	N/A	0.588	N/A	N/A					
	Storey	N/A	0.016	N/A	N/A					
	Washoe	N/A	2.240	N/A	N/A					

[a] Interstates only counties in the Nevada portion of the AQCR are included

[b] 24 hour maximum

Table A-12. Nevada Fuel Combustion Regulations[a]

Particulate Matter

(1) State of Nevada - No person shall cause, suffer, allow or permit the emissions of particulate matter resulting from the combustion of fuel in excess of the quantity set forth in the following table:

Maximum equipment capacity rate in million kilogram-calories per hour	Maximum allowable emissions of particulate matter in kilograms per hour per million kilogram-calories of heat input
Up to and including 2.5	1.08
25	0.64
250	0.37
2500	0.16
25000	0.044

- For heat input greater than 2.5 million kilogram-calories (10 million Btu's) per hour, but less than 1,000 million kilogram-calories (4000 million Btu's) per hour, the allowable emissions shall be calculated using the following equation:

$$Y = 1.34 \times^{-0.231} \quad (1.02 \times^{-0.231})$$

X = Maximum equipment capacity rate in million kilogram-calories (million Btu's) per hour

Y = Allowable rate of emission in kilograms per million kilogram-calories (pounds per million Btu's)

- For heat inputs equal to or greater than 1000 million kilogram-calories (4000 million Btu's) per hour, the emission shall be calculated using the following equation:

Table A-12. Nevada Fuel Combustion Regulations[a] (Continued)

$$Y = 13.9 \times^{-0.568} \quad (17.0 \times^{-0.568})$$

X = Maximum equipment capacity rate in million kilogram-calories (million Btu's) per hour

Y = Allowable rate of emissions in kilograms per million kilogram-calories (pounds per million Btu's)

- For purposes of these regulations, the heat input shall be the aggregate heat content of all fuels whose products of combustion pass through a stack or stacks, or the equipment manufacturer's or designer's guaranteed maximum heat input, whichever is greater. The total heat input of all fuel burning units in a plant or on the premises shall be used for determining the maximum allowable amount of particulate matter which may be emitted.

(2) Washoe County - It is unlawful for any person to discharge or cause to be discharged, into the atmosphere from any source, particulate matter in excess of 0.15 grains per cubic foot at standard conditions.

(3) Clark County - Same as the State.

Sulfur Oxides

(1) State of Nevada - No person shall cause, suffer, allow or permit the emission of sulfur compounds caused by the combustion of fuel in excess of the quantity set forth in the following:

Heat input, million of kilogram-calories per hour	Maximum sulfur emission, kilograms per hour
10	12.6
100	72.0
1000	720.0
10000	1890.0
100000	18900.0

Table A-12. Nevada Fuel Combustion Regulations[a] (Continued)

- Where a source located on contiguous property has a total heat input of less than 63 million kilogram-calories (250 million Btu's) per hour the allowable emission shall be calculated by the use of the following equation:

  $Y = 1.26 x \quad (Y = 0.7 x)$

  X = Maximum heat input in millions of kilogram-calories (Btu's) per hour

  Y = Allowable rate of sulfur emission in kilograms (pounds) per hour

- Where a source located on contiguous property has a total heat input of greater than 63 million kilogram-calories (250 million Btu's) per hour but less than 1.26 billion kilogram-calories (5 billion Btu's) per hour, the allowable sulfur emissions shall be calculated by use of the following equation:

  $Y = 0.72 x \quad (Y = 0.4 x)$

  X = Maximum heat input in millions of kilogram-calories (Btu's) per hour

  Y = Allowable rate of sulfur emission in kilograms (pounds) per hour

- Where a source located on contiguous property has a total heat input of greater than 1.26 billion kilogram-calories (5 billion Btu's) per hour the allowable emission shall be calculated by the use of the following equation:

  $Y = 0.189 x \quad (Y = 0.105 x)$

  X = Maximum heat input in millions of kilogram-calories (Btu's) per hour

  Y = Allowable rate of sulfur emission in kilograms (pounds) per hour

Table A-12. Nevada Fuel Combustion Regulations[a] (Continued)

- For purposes of these regulations, "sulfur emission" means the sulfur portion of the sulfur compounds emitted.

(2) Clark County - No person shall cause or permit the emission of sulfur dioxide from any fuel burning equipment in excess of the quantity set forth in the following table:

Heat input, millions of Btu's per hour	Maximum allowable rate of emission of SO_2, pounds per hour
1000	150
5000	750
10000	1500
15000	2250
20000	3000
25000	3750
30000	4500
35000	5250
40000	6000
45000	6750
50000	7500

- Maximum allowable emission rate of sulfur dioxide shall be determined by using the equation

  $Z = 0.15X$ where Z = allowable rate of sulfur dioxide emissions in pounds per hour and

  X = Maximum heat input in millions of Btu per hour.

- It is unlawful for any person to store, offer for sale, burn, or cause to be burned, within Clark County at any time, any commercial fuel oil having a sulfur content in excess of 1.0 percent by weight.

(3) Washoe County - It is unlawful for any person to discharge, or cause to be discharged, into the atmosphere, any one or more of the following contaminants, in any state or combination thereof, exceeding in concentration at the point of discharge.

Table A-12. Nevada Fuel Combustion Regulations[a] (Continued)

A. Sulfur compounds calculated as sulfur dioxide (SO_2): 0.2 percent, by volume.

B. Combustion contaminants: 0.15 grains per cubic foot of gas calculated at 12% of carbon dioxide (CO_2) at standard condition.

- Sulfur content of fuel:

A. Less than 250 million Btu per hour heat input:
It is unlawful for any person to burn, or cause to be burned, within the District at any time, a fuel having a sulfur content in excess of 1.0% by weight.

B. For 250 million or more Btu per hour heat input the allowable emissions shall be calculated by use of the following formula:

$Y = 0.105X$

X = Minimum heat input, number of millions of Btu per hour

Y = Allowable rate of sulfur emissions in pounds per hour

C. Fuels with sulfur content exceeding the above limitations may be used if it can be shown that adequate sulfur removal equipment is present to limit the sulfur emissions into the atmosphere to the same degree as if fuels with the proper sulfur content had been used.

[a]From Nevada SIP Amendments (9/74), Clark and Washoe County regulations.

APPENDIX B. REGIONAL AIR QUALITY ANALYSIS

Tables B-1 and B-2 are the assessment of AQCR's which should be examined for the fuel switching impact in particulate and SO_2 emissions. They also provide an identification for those AQCR's which show little potential for fuel revision or regulation relaxation if ambient air standards are to be attained.

The criteria for candidates are (1) the severity and breadth of air quality violations, (2) the tolerance for emissions increases in the AQCR, (3) the fraction of total emissions resulting from fuel combustion and (4) AQMA designations. It should be noted that an AQCR may not necessarily need relaxation of regulations in order to accomplish fuel switching. Further, a good candidate in Tables B-1 and B-2 may later show little potential for fuel switching after individual sources are examined. Finally, it is possible that an AQCR may have air quality levels below standard at present and may require more strict regulations than currently exist if all fuel burning sources were converted to dirtier fuels, i.e., "average" emission rates now may be below "average" regulations.

Table B-1. Nevada Candidacy Assessment for Revision of Particulate Regulations

AQCR	# of Stations	# of Stations Reporting Violations of National Secondary Standard		Expected Attainment Date	Counties with Proposed AQMA Designation for Particulates?	1972 Total Emissions (tons/yr)	% Emissions from Fuel Combustion	Tolerance for Emission Increase in 1975 (tons/year)	Regionwide Evaluation
		Annual	24 Hour						
Clark-Monave-Yuma[a]	16	8	9	7/75	Yes	63,128	14	-51,200	Poor Candidate
Nevada Intrastate	9	2	3	7/77	No	37,189	0.8	-20,080	Poor Candidate
Northwest Nevada Intrastate	15	8	6	7/77	Yes	3,344	14.9	- 1,730	Poor Candidate

[a]Interstate; information included is for the Nevada portion of the AQCR

Table B-2. Nevada Candidacy Assessment for Revision of SO_2 Regulations

AQCR	# of Stations	# of Stations Reporting Violations of National Secondary Standards		Expected Attainment Date	Counties with Proposed AQMA Designation for SO_2?	1972 Total Emissions (tons/yr)	% Emissions from Fuel Combustion	Tolerance for Emission Increase in 1975 (tons/year)	Regionwide Evaluation
		Annual	24-hour						
Clark-Mohave-Yuma[a]	0	N/A	N/A	7/75	No	57,024	97.5	N/A	Marginal Candidate
Nevada Intrastate	9	2	5	7/77	No	275,264	0.6	-236,727	Poor Candidate
Northwest Nevada Intrastate	0	N/A	N/A	b	No	3,753	31.1	N/A	Marginal Candidate

[a] Interstate; information included is for the Nevada portion of the AQCR

[b] Ambient air quality was below standards when the SIP was written

N/A = not available

APPENDIX C. POWER PLANT ASSESSMENT

This section is a review of individual power plants by AQCR. The intent is to illustrate fuel switching possibilities and particulate and SO_2 emissions resulting from these switches on an individual plant basis.

For the purposes here, it is assumed that when a plant is shown to have dual fuel capability, it is able to use entirely one fuel or the other. A fuel switch calculation is then made, assuming all natural gas use is replaced by either oil or coal depending on assumed plant capabilities. Further, oil use is replaced by coal where possible. The % sulfur in fuel (coal or oil) assumed when fuels are switched is indicated in Table C-1. A plant was then assumed to have the same emissions controls as was in effect when the NEDS emissions were assembled.

Also shown are the regulations which are currently applicable to the given plant, taken from Table A-12. (Limits are assumed to be based on the entire heat input of the plant. Actual rules may be different when applied to to each of several boilers in a power plant or applied on the basis of design capacity rather than the actual amount of fuel used.)

The fuel switch calculations are intended to show the magnitude of emission increase accompanying a fuel switch without additional controls. The exact emissions would depend upon actual fuel mix, amount of sulfur in fuels and degree of emission controls.

It might be cautioned that AQCR total emissions calculated in the tables of Appendix C (and also Appendix D) may not agree exactly with total emissions represented in Appendix A. This is a result of both differing fuel schedules in 1973 compared to previous years, and the relative "completeness" of the NEDS data bank.

Table C-1 Nevada Power Plant Assessment [1]

AQCR	Plant	Capacity (MW)	Fuel Use [2] Type & % S & A	Annual Quantity	Heat Input (10^6 Btu/hr)	Emissions [3] Tons/yr SO_2	Tons/yr Part	Lbs/hr SO_2	Lbs/10^6 Btu Part	Emission Limit Lbs/hr SO_2	Lbs/10^6 Btu Part	S in Solution	Emissions After Fuel Switching [4] Tons/yr SO_2	Tons/yr Part	Lbs/hr SO_2	Lbs/10^6 Btu Part
Clark-Mohave-Lake	Mohave	1520	Coal 0.57% S	3276	9975	11743	340	7047	0.094							
			Gas	5315	607	N/A	N/A	N/A	N/A	1437	0.091	0.51	3890	414	2737	0.394
	Reid-Gardner	227	Coal 0.53% S Ht A	679	1723	6368	1708	1462	0.23	210	0.08	0.51	-	-	-	-
	Clar	190	Oil	4326	74	172	105	39	0.017							
			Gas	11734	1339	N/A	N/A	N/A	N/A	232	0.19	0.6	884	1005	750	0.83
	Sunrise	82	Oil	3308	57	131	54	30	0.019							
			Gas	43k7	893	N/A	N/A	N/A	N/A	83.4	0.23	N/A	1078	483	292	0.54
Nw Nevada Interstate	Ft. Churchill	22	Oil 0.9% S	1428	24.5	101	6	23	0.056							
			Gas	14226	1624	4	107	0.9	0.015	659	0.18	0.9	679k	404	1880	1.208
	Tracy	133	Oil 0.8% S	1410	24	88	6	20	0.057							
			Gas	3520	402	1	26	0.2	0.015	170	0.25	0.8	1562	107	367	0.267

Table C-1 Nevada Power Plant Assessment (Continued)

[a] Only steam electric units are considered

[b] Interstate; only power plants in the nevada portion are considered

[c] Data from the following sources - for Mohave, Reid-Gardner, Clark and Sunrise : 1973 NEDS (as of August 1, 1974)
- for Ft. Churchill : 1973 Federal Power Commission data
- for Tracy : 1972 NEDS (as of December 6, 1974)

Heat content of fuels assumed to be : Coal = 24 million Btu per ton
Oil = 150,000 Btu per gallon
Gas = 1000 Btu per scf

Coal use in terms of 10^3 tons
Oil use in terms of 10^3 gallons
Gas use in terms of 10^6 ft^3

[d] Data from the following sources - for Mohave, Reid-Gardner, Clark and Sunrise : 1973 NEDS (as of August 1, 1974)
- for Ft. Churchill : calculated from Table C-2
- for Tracy : 1972 NEDS (as of December 6, 1974)

[e] For power plants using both natural gas and oil: Convert the quantity of natural gas used into an equivalent quantity of oil with the same sulfur content. Increase the SO_2 and particulate emissions by direct proportioning assuming all fuel used is oil. For plants burning both coal and natural gas or coal and oil, the same procedure is utilized but assuming all fuel burned is coal.

Table C-2. AP-42 Power Generation Emission Factors

Fuel	Particulates		SO_2		Hydrocarbons		NO_x (as NO_2)	
	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu	Lbs/Ton	Lbs/10^6 Btu
Coal[1] (Bit.)								
General	160	7.4			0.3	0.013	18	0.78
Wetbottom 10% A	130	7.0					30	1.3
Cyclone	20	0.9					55	2.4
1% S	Same	Same	38	1.65	0.?	0.13	Same	Same
2% S	as	as	76	3.3			as	as
3% S	Above	Above	114	5.0			Above	Above
Oil[2]	Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal		Lb/10^3 Gal	
0.5% S	8	0.058	79	0.56	2	.014	105	0.75
1.0% S	8	.058	157	1.12	2	.014	105	0.75
2.0% S	8	.058	314	2.24	2	.014	105	0.75
Gas[3]	Lb/10^6Ft^3		Lb/10^6Ft^3		Lb/10^6Ft^3		Lb/10^6Ft^3	
(.3 lbs S/ 10^6 Ft^3)	15	.015	0.57	.00057	1	.001	600	0.60

(1) Coal 23 x 10^6 Btu/Ton
(2) Oil 140 x 10^3 Btu/Gal
(3) Gas 1000 Btu/Ft^3

APPENDIX D. INDUSTRIAL, COMMERCIAL, INSTITUTIONAL SOURCE ASSESSMENT

Table D-1 in this appendix lists individual industrial/commercial/institutional sources of particulates and SO_2 emissions which might show fuel switching potential.

Table D-1 Nevada Commercial, Industrial and Institutional Source Assessment

AQCR	Plant	Fuel Use[b] Type S S A	Annual Quantity	Heat Input (10^6Btu/hr)	Emissions[c] Particulate lb/10^6Btu	Particulate tons/yr	SO_x lb/10^6Btu	SO_x tons/yr	Emission Limit[d] Particulate lb/10^6Btu	Particulate tons/yr	Ambient Impact[e] Annual Conc. Particulate	SO_x	Comments
Clark-Mohave-Yuma	Stauffer Chemical	Gas	3080	352	28	7	0.048	0.22	0.24	48.0	11	1.05	
Nevada Intrastate	Foote Mineral	Oil 0.73%S	461	10.3	2	28	0.062	0.9	0.43	4.3	14	0.4	
	Barrold	Oil 0.2%S	16	4.3	0	0	0	0	0.72	3.0	0.8	0.4	
	Carlin Gold Mining	Oil 0.3%S	310	17.2	0	8	0	4.3	0.60	12.04	13.2	16.2	These figures indicate the emissions which would result if the sources were to emit particulate matter at the maximum quantity permitted in terms of lbs/10^6Btu as allowed by regulation.
	AEC Nevada Test Site	Oil 0.05%S Oil 0.5%S	484 303	7.7 4.8	0 1	0 6	0 0.047	0 1.37	0.44	8.75	11	10.1	
	Kennecott Copper Corp.	Coal 0.7%S	100	526.5	138	1402	0.12	441.9	0.23	310.4	245	440	
Nal Nevada Intrastate	Nevada Highway Dept	Oil 1.0%S	116	1.85	0	9	0	2.05	0.90	1.3	2.1	4.7	

Table D-1 (continued)

[a] Includes only sources with external combustion engines

[b] 1974 data in NEDS as of November, 1974

Note: a) The number of hours of operation are also from NEDS and are as follows:

- Stauffer Chemical = 8760
- Foote Mineral = 6240
- Baroid = 520
- Carlin Gold Mining = 2520
- AEC Nevada Test Site = 8760
- Kennecott Copper Corporation = 4368
- Nevada Department of Highways = 8760

b) Heat content of fuels assumed to be

Gas = 1000 Btu per ft^3

Oil = 140,000 Btu per gallon

Coal = 23 million Btu per ton

c) Gas in terms of million cubic feet

Oil in terms of thousand gallons

Coal in terms of thousand tons

[c] 1972 data in NEDS as of November, 1974

[d] Interstate; plants included are only those in the Nevada portion

APPENDIX E. AREA SOURCE ASSESSMENT

The State of Nevada was found to have no area sources which could be analyzed within the context of Section 4 of ESECA.

BIBLIOGRAPHY

(1) "1972 National Emissions Report", U.S. Environmental Protection Agency, EPA-450/2-74-012.

(2) "Federal Air Quality Control Regions", U.S..Environmental Protection Agency, Publication No. AP-102.

(3) "Compilation of Air Pollution Emission Factors, 2nd Edition", U.S. Environmental Protection Agency, Air Pollution Technical Publication AP-42, April 1973.

(4) SAROAD Data Bank, 1973 Information, U.S. Environmental Protection Agency.

(5) "Monitoring and Air Quality Trends Report, 1972", U.S. Environmental Protection Agency, EPA-450/1-73-004.

(6) "Air Quality Implementation Plan for the State of Nevada", January 28,1972.